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will be devoted to instructional purposes, gives an increase of \$50,000 over the total appropriations for the present year. Forty thousand dollars of the increase is in the allotment for instructional purposes.

COOPER MEDICAL COLLEGE, San Francisco, has been made the medical department of Stanford University.

THE Keokuk Medical College, of Keokuk, Iowa, has been merged with the College of Medicine of Drake University, at Des Moines.

THERE have lately been added a thousand acres to the reservation of the Forest Summer School of Yale University at Milford, Pa. Students of the Scientific School seeking advanced courses in forestry must take extra scientific courses in the senior year and pass two sessions at the Forest Summer School, to which seven new courses have been added.

THE new building for biology and geology at Amherst College has reached a point where it is nearly ready for its roof. It has a frontage of about 140 feet and is two stories high. The construction is of reinforced concrete.

THE new directory of the University of Wisconsin, now in press, shows 3,237 students in attendance, exclusive of the winter dairy and agriculture courses and the summer session. With these added the total attendance will exceed 4,500. The freshman class this year numbers 945, an increase of 106 over that of last year.

AT a meeting of the board of trustees of the University of Arkansas, on November 5, Dr. C. F. Adams was made acting dean and director of the College of Agriculture and Agricultural Experiment Station, succeeding W. G. Vincenheller, resigned.

DR. FREDERIC BRUSH, of Boston, has been appointed superintendent of the New York Post-graduate Medical School and Hospital.

DR. W. A. SYME has been promoted from an instructorship in chemistry to be assistant professor of chemistry in the North Carolina College of Agriculture and Mechanic Arts, and Mr. Hubert Hill, B.S., M.S. (University of North Carolina), has been appointed instructor in chemistry. Mr. J. K. Plummer,

B.S. (North Carolina A. & M. College), has been appointed assistant chemist of the Experiment Station.

REGINALD E. HORE, instructor in petrography at the University of Michigan, has resigned, to take a position of lecturer on geology at the School of Mining, Kingston, Canada.

MR. ELLIS L. EDWARDS (Oklahoma, '05), lately a graduate student at the University of Nebraska, has been appointed tutor in geology at the University of Texas.

DR. T. R. ELLIOTT, late scholar of Trinity College, Cambridge, has been elected to a fellowship at Clare College. Dr. Elliott was placed in the first class of the Natural Sciences Tripos in 1900 and 1901.

THE following have been elected to fellowships at St. John's College, Cambridge: Mr. W. L. Balls, M.A., first class of the natural sciences tripos (botany); bracketed for the Walsingham medal. Mr. Balls is at present engaged in scientific investigations connected with cotton in Egypt. Mr. J. A. Crowther, B.A., first class of the natural sciences tripos (physics); Hutchinson research student at St. John's College; research student at Emmanuel College; Mackinnon student of the Royal Society. Mr. Crowther is at present residing in Cambridge and is engaged in physical research.

DR. F. W. LAMB has resigned his post as assistant lecturer in physiology at University College, Cardiff, on his appointment as senior demonstrator in physiology at Victoria University, Manchester, and the council have appointed Mr. R. R. M'Kenzie Wallace, of Cambridge University, to succeed him.

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#### DISCUSSION AND CORRESPONDENCE

##### THE TRAINING OF INDUSTRIAL CHEMISTS

TO THE EDITOR OF SCIENCE: The address of Professor F. S. Kipping to the Chemical Section of the British Association, at the recent Dublin Meeting, and reported in abstract in the current issue of SCIENCE (October 30, 1908), contains some opinions which deserve the attention of all thoughtful teachers of industrial chemistry. The critical condition of

England, the realization of this situation, and the scholarship and standing of Professor Kipping, all vouch for the sincerity of the views expressed; and these considerations make it more surprising that this able student and teacher should, as reported, deliberately advise against the methods of teaching industrial chemistry which are now recognized as capable of giving practical results. The unfortunately conservative views expressed are still more interesting, because Professor Kipping explicitly states that "This section . . . does not attempt to distinguish pure from applied chemistry." This sentence should be noted; for it implicitly recognizes the common sense of the question, What is it good for; a question which should be the text and guide of all teaching and research.

The views of Professor Kipping are told in these words:

On consulting the opinions of the manufacturers, it would seem that they attach great importance to what is called the "practical side"; they believe that, in addition to a knowledge of theoretical chemistry, the prospective works-chemist should also have some acquaintance with engineering, should understand the apparatus and machinery used in the particular manufacturing operations with which he is going to deal, and should have had practical experience in working the given process. . . . The arguments in favor of this view, that it is a hybrid chemist-engineer who is required in a chemical works, seem to me to be fundamentally unsound, and the kind of training suggested by them for the works-chemist can only result in the production of a sort of combined analytical machine and foreman. . . . We can not possibly expect such a poorly trained jack-of-all-trades to run a chemical works successfully in the face of competition directed by a large staff of scientific experts in chemistry and engineering.

These quotations are worth reading carefully; for they show two things: one, that I have not misrepresented Professor Kipping; and the other, that he has considered the situation with some care. But the quotations also show another thing, namely, that Professor Kipping has never been in active responsibility of a chemical works and really does not understand practical industry; and because of his own work and standing, his

address may cause much hindrance and damage among the readers of SCIENCE. I venture to argue that the views of Professor Kipping are wrong; and that, in view of the necessities of American chemical engineering, at least, they are dangerous. What is needed is just this "combined analytical machine and foreman."

In discussing the broader relations of industrial education, Dr. Andrew S. Draper, state commissioner of education of New York, has most wisely pointed out the over-balance of intellectualism as compared with industrialism in our whole scheme of education; and this applies also with force and reason to our splendid system of training chemists in technical school, college and university. We are in no danger now—it may have been different twenty years ago—from the *practical* trenching on the *theoretical*. We have well-trained students of chemistry, trained in theory and research, by the hundreds; but they were started in a theoretical atmosphere, and they find exceeding difficulty in getting out of that atmosphere. These fine young students have information by the brainful, but they are "muscle-bound," to use the metaphor of an eminent professional athlete. And worse than that, these prodigies of academic training have not the faintest notion of how to *apply* one thousandth part of what they know in a merely intellectual way. What these graduates in chemistry might do if they could have learned the work-shop ideas of the *use*, the *need*, the *trouble*, the *remedy*—what they might do if they had some notion of this practical side, can be only surmised; but industrial necessities demand that the obvious gap in our system of chemical training be filled up without delay.

It must be noted that it takes all kinds of men to make a world. For one superintendent of a chemical works, there must be half a dozen foremen, and perhaps a dozen analysts and assayers; and it is desirable that every workman should know something of both the theory and practise of his trade. If a young man is content to plan for a subordinate position, as a mere analyst or research

chemist—and I should use the word, “mere,” with care, especially when one recalls such assemblies of scholars as are gathered in such a research laboratory as that of the Badische Anilin-und-Soda Fabrik, but if a young man plans for such a position, the remarks of Professor Kipping may well apply. But that suits well with the conditions of the past; what we are concerned with is what touches the present needs.

One feature of American manufacture is the remarkable development of machinery and power application; and a great lack in this development is the very absence of what should be the chemical-engineering side of it. Now such a nation as Germany has both sides. Why should not America also have both sides? But the only way to reform is to reform; and now that we see the need, it is only necessary to follow in the path indicated. We have a store of well-trained chemists. We have a store of engineers. We lack the adequate supply of practical chemical engineers. It is easy to produce this needed supply—by teaching the chemist engineering; and by giving him teachers who have been and are in touch with the practical. Moreover, there is a great need of reforming the methods of teaching chemistry. With the safeguarding of the curriculum by employing men who know and respect theory, it is feasible to start the student with the practical idea; then he will never get away from it, he will see it always, he will love it and he will use it. For he will learn the dignity and worth of putting theory into overalls; and in turn he will learn the method and value of dressing practise with the dignity of theory.

CHARLES S. PALMER

NEWTONVILLE, MASS.

#### AURORAL DISPLAYS

IN the issue of *SCIENCE* dated July 10, I described a remarkable illumination of the sky at Sandy Hook, N. J., on the evening of March 27. Since that date I have witnessed two more sky glows, one on the night of August 18, and another on September 4. I had been quite prepared for further exhibitions of

this kind, as a dispatch to the *New York Sun* from Washington, August 8, 1908, stated that there had been an unusual number of auroral displays or sky glows visible in Europe and the eastern part of the United States.

On August 18, I was at Murray Bay, Canada, on the lower St. Lawrence. The night of August 17–18 was cool, rainy and foggy. The afternoon of the eighteenth was windy and clear, and the evening was cool, calm and clear. The few days previous had been unusually warm. On the eighteenth, about 8 P.M., I first noted a rich glow in the west. This was followed, shortly afterwards, by the appearance of shafts spreading from about ten degrees north of west around by the north to almost due east. The illumination in some cases reached almost to the zenith. The shafts appeared and vanished with bewildering rapidity, and quite a number of spiral luminous clouds and persistent bright patches were visible. The illumination lasted until about ten o'clock. There was no moon, yet the general effect of the display was a diffused light about equal to that given by the moon at a quarter-phase.

The exhibition of the night of September 4 was noted at Fort Terry on Plum Island about ten miles from New London, Conn. The same succession in weather conditions had prevailed; hot weather followed by heavy rains, and clear cooler weather. The first indication was at 7:15 P.M., and consisted of a streamer about 60 degrees in length, rising from the horizon about ten degrees west of north. Other streamers in great number but much more attenuated appeared east of north. Some of these faded very quickly, to be followed by new ones, while others were quite persistent, and had a distinct motion towards the west. At about 8 o'clock a bright flat glow was noted almost due north, and shortly afterwards the northern illumination faded. At about 8:45 some peculiar striated luminous clouds appeared in the southwest, followed in turn by a few pale streamers due north. The display closed altogether about 9:30 P.M. It should be noted that the sky became somewhat cloudy towards the end of the display and